ENTOMOLOGICAL NEWS

DECEMBER, 1942

Vol. LIII No. 10

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PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES.
1900 Race Street

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section 1, Act of October 3, 1917, authorized January 15, 1921.

ENTOMOLOGICAL NEWS

published monthly, excepting August and September, by the American Entomological Society.

Philip P. Calvert, Ph.D., Editor; E. T. Cresson, Jr., R. G. Schmieder, Ph.D., V. S. L. Pate, L. S. Mackey, A. G. Richards, Jr., Ph.D., J. W. H. Rehn, Associate Editors.

Subscription price, U. S. Currency, per year of ten (10) numbers: United States, Central and South America $3.00, Canada $3.15, Foreign $3.30.

ADVERTISING RATES: Full width of page. Payments in advance.

	1 Inch	2 Inches	3 Inches	6 Inches
One Issue	$ 1.00	$ 1.90	$ 2.75	$ 4.80
Five Issues	4.50	8.[illegible]	12.00	21.00
Ten Issues	8.00	15.00	21.00	36.00

SUBSCRIPTIONS. All remittances and communications regarding subscriptions, non-receipt of the "News" or of reprints, and requests for sample copies, should be addressed to

ENTOMOLOGICAL NEWS, 1900 Race Street, PHILADELPHIA, PA.

MANUSCRIPTS AND ADVERTISEMENTS should be sent to the editor, Dr. P. P. Calvert, P. O. Box 14, Cheyney, Pennsylvania. The receipt of all papers will be acknowledged and, if accepted they will be published as soon as possible. If not accepted, authors will be so advised and postage requested for return of manuscripts. Articles longer than six printed pages will be published in two or more installments, unless the author is willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division. Proof will be sent to authors.

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ENTOMOLOGICAL NEWS

VOL. LIII DECEMBER, 1942 No 10

An Appreciation

The first number of ENTOMOLOGICAL NEWS appeared on January 14, 1890, printed by Paul C. Stockhausen, at 55 North 7th Street, Philadelphia. With two interruptions of one year each, he continued to print it to his death, in July, 1935, as gratefully recorded in the NEWS for October of that year. Since his decease his Estate, under the management of Mr. Charles O. Weber, has continued its publication. The economic events of the last year have had their effects on the printing business and the Estate has decided that it can no longer carry on. We are, therefore, compelled to seek another printer and to announce that at the end of a period of fifty-three years, the honored name of Stockhausen will not be associated with the NEWS after December, 1942. We regret to lose our contact with Mr. Weber who has seen us through our trials and our joys of the past seven and one-half years and he carries with him our best wishes for his future activities.

The Circling of Gyrinus (Coleoptera: Gyrinidae)

By CYRIL E. ABBOTT, Harding College,
Searcy, Arkansas

This is by way of reply to a note by C. Brooke Worth which appeared in the June issue (Vol. LIII, No. 6) of Entomological News, concerning the circling of *Gyrinus*. Worth's communication objects to my conclusion that the circling of *Gyrinus* increases the probability that it will encounter prey. The following analysis, a copy of which has also been sent to Dr. Worth, I hope will be published—not simply as an attempted refutation of his conclusion, but for the sake of arousing in others interest in the solution of this problem.

In the first place I want to state positively that I regret having given the impression that the circular movements of *Gyrinus* may be due *entirely* to the increased chances for encountering prey. Indeed, it is a fixed intention of mine never to accept an explanation as final. A living organism of the simplest kind is so complex that even apparently single, automatic responses are seldom the result of a single cause, nor are they generally as simple as they appear. I have as yet to investigate some other possibilities with respect to *Gyrinus*. Some of these will be evident from what follows.

The difficulty in understanding how circling can increase chance encounters may arise from a limited knowledge of the habits of *Gyrinus*. These beetles generally congregate close to the shores of lakes and rivers, and it is only occasionally that they spend long periods in open water.

Now this habit is probably partly the result of efforts of the insects to avoid rough water. But one should also remember that the shore is generally lined with plants, often, if not generally, overhanging the water, from which small insects fall upon the surface of river, lake, or pond. Therefore, the chances for *Gyrinus* to encounter prey are definitely dependent upon remaining inshore. If the beetle swims in a straight line toward the open water, its chance of encountering floating insects decreases progressively. It can, of course, follow the shoreline, in which case its path is necessarily undulatory. As a matter of fact, *Gyrinus* actually does this. Its circling is almost never confined to a single circle of constant diameter, but may be cycloid, ellipsoidal, or it may be that of a "figure eight' ; it may be such that the insect is confined to a limited area, or it may carry the animal considerable distance from its starting point.

The "territory already found sterile" may not remain so near the shoreline where *Gyrinus* is generally found. Unless one is willing to postulate that a spot "found sterile" will remain so for some time, this objection will not hold. And I have already pointed out that insects are constantly falling from the foliage overhead.

I am probably the world's worst mathematician, but, if my simple arithmetic is correct, a square has a greater area than any other rectangle of equal perimeter. If *Gyrinus* moves in a circle with a radius of 2 cm., and if we assume that a strip 2 cm. in width around the circle is within the vibratory "sphere of influence," we find that the diameter of the larger circle is 8 cm. This squared gives us a surface of approximately 64 sq. cm. But the perimeter of *Gyrinus'* circle is approximately 12.5 cm., and assuming that this is extended in a straight line, there is then a total area of influence of 4 cm. The product of these is 50 sq. cm. —14 cm. less than that of the inscribed circle.

Of course, the advantage of this is only present if it can be demonstrated that the number of insects falling within this area is greater than would be the case if the insect moved along a different path. As I have indicated above, I believe this to be the case.

There are undoubtedly other factors that tend to confine *Gyrinus* to a given locality through circling. Among these are the various effects of light and shade, the relative roughness of the water's surface, and a possible "social effect." As to the last, I have noted that the more specimens there are in a given area, the less active the beetles become, and the smaller the curves they describe. Undoubtedly, the presence of other members of its own species has an effect upon *Gyrinus,* though it may be that the peculiarities of group behavior are a concomitant with the formation of the group, and with it the result of a common cause.

Please do not have the impression that I am merely trying to defend a position that is untenable, for if such is the case I am willing to alter my conclusions. I simply do not agree that Worth's brief analysis disposes of the question.

Studies on Sibling Callosamia angulifera (Lepidoptera: Saturnidae).

By C. Brooke Worth, Swarthmore College,
Swarthmore, Pennsylvania.

(Continued from Page 244.)

Phylogenetically it is probably the female that has increased relatively in size rather than the male's having become smaller, the species' loss of the digestive function at maturity having made it incumbent upon females to hatch with large numbers of eggs already maturing. But there are undoubtedly forces tending to enlarge the males, too. Greater strength in flight would give larger males an advantage over smaller ones in reaching the females first. But this tendency may be overbalanced by the g r e a t e r physiologic value in the advanced hatching-date of small males. Thus the present difference in the sizes of the sexes of this species is an indication of the optimum disparity in weight or in quantity of metabolically active tissue.

The hatching sequence of each sex was again random, that is, the successive males or females were not invariably larger than their respective predecessors; nor could I detect even a tendency for this to be true. The very last cocoon to hatch happened actually to be an exceptionally small female. Thus the above physiological generalizations must be looked at quite broadly in terms, as I have said, of the species as a whole. But the lack of successive increase in size of hatching males and females in this series does show a definite physiological variation among the siblings, in accord wth my observations during their larval days.

There were also readily seen differences in the colors and patterns of the moths' wings. The males v a r i e d between brownish and blackish, the females between reddish-brown and orange-red. The angular markings on the wings of both sexes also showed variations in their breadth or narrowness.

I was unable to note many differences in the moths' behavior. The principal one was in the choice of a site for clinging while the wings grew—this inequality in reaction was reminiscent of

the antics observed during the cocoon-spinning epoch. Most of the moths appeared to be quite content to hang from the wire-netting of their cage. But an occasional one seemed to have no inclination for being thus confined. Racing up and down the walls and over the layer of unhatched cocoons at the bottom, dragging its already e x p a n d i n g wings without apparent regard to injuries sustained by those delicate appendages in their crucial state, k n o c k i n g down many a more phlegmatic sister or brother, this moth might not resign itself to the cage for an hour or more and would invariably have to pay for its lack of docility by finally acquiring hopelessly deformed wings.

The mating behavior of the m o t h s was quite uniform. Females placed on the same screened porch as their dead mother were discovered by wild males at approximately nine o'clock every night. Copulation lasted about two to two-and-a-half hours. If the females were allowed to remain on the porch overnight they laid no eggs. Nor did females placed in a box lay eggs the first night. Apparently, they are able to resist the impulse to lay for at least twenty-four hours in the absence of the proper stimulus, that is, the foliage of a plant suitable to the future larvae. Females placed in nets surrounding a tulip poplar branch began laying eggs almost immediately following the termination of copulation.

While the males gathered outside the screened porch, we kept the lights burning in our house as usual. Yet not a male fluttered against the windows toward the light. The mating instinct was stronger than positive phototropism. Nor did the light seem to interfere at all with the males' sense of the females' direction and position: they readily found the exact spots on the screen behind which females were waiting, even though in some cases one of the lights was shining directly upon them.

In no case did any of the females mate with more than one male. I mention this because of an experience I once had when wishing to raise sibling *T. polyphemus*. The virginal female was tied with string to a twig out-of-doors. The next morning

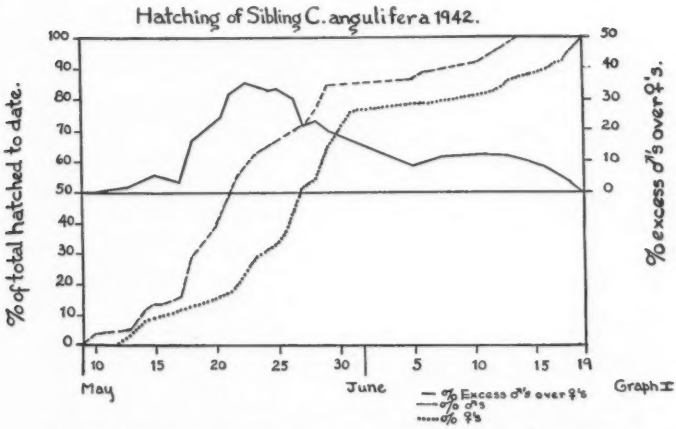
she was mated to one male while two other males clung to the copulating pair. At four o'clock in the afternoon the first male unclasped, whereupon a second one immediately continued the act of fertilization. At nine that night he ceased, and the third and last one copulated with the female for two hours longer. Thus the capture of an already fertilized wild moth cannot always give one assurance that the offspring will be full-blooded siblings.

Of the original one hundred and ten cocoons of *C. angulifera,* only ninety-eight hatched. The remaining twelve showed three general causes of death: failure of the caterpillar to pupate; drying of the pupa without imaginal metamorphosis; and death of the pupa after varying degrees of imaginal metamorphosis had occurred. Metazoal parasitization of the caterpillars had been eliminated by the use of protective mosquito-netting bags. Hence these deaths must have been due either to disease caused by micro-organisms or else to constitutional or genetic deficiencies of the caterpillars and pupae themselves.

Among successfully hatched cocoons there were thirty-nine males and fifty-nine females. While this is a ratio of approximately two to three, it does not deviate sufficiently from a one-to-one sex ratio to be significant. It is even possible that unknown factors in the rearing of the caterpillars favored the survival of females.

In Graph I, I have charted the successively hatching moths in terms of the percent total of each sex hatched to date. It will be seen in this comparison that males always retained their lead over the females; that the first male preceded the first female by three days; and that the last female followed the last male by six days. It is barely conceivable that a six-day-old male might still be able to fertilize a female!

The effect of temperature is readily seen in the graph. The last half of May was uniformly warm and dry. During this period most of the moths hatched. June started in with a cloudy period, however, with some rain and many chilly days. Few moths hatched during this interval. After June 8 it became warm again and hatching was promptly resumed.



To emphasize the tendency of males to hatch before females, I have also charted the percent excess of hatched males over hatched females on successive dates. This curve is striking in the demonstration that when hatching is most rapid *in both sexes,* the relative excess of males over females also reaches *its* maximum. The period May 20 to 27 represents the peak of such excessive hatching activity among the males. A secondary tendency toward a peak—or at least a resistance to decline—is seen at the beginning of warm weather following the first week of June. After hatching of the last male on June 13, the curve naturally drops rapidly to zero.

It may be finally remarked that hatching of these moths required forty days from start to finish. The initial four-day difference in their ages was, therefore, ultimately stretched to thirty-six days. Males hatched during a thirty-four-day period, females during thirty-seven days. Thus a pronounced chronological difference in hatching physiology became evident in siblings of approximately equal age, amounting to thirty days among males and thirty-three days among f e m a l e s. This variation is in surprising accord with the one noted when the caterpillars spun their cocoons: for the complete annual cycle of my colony of sibling *C. angulifera* it *still* consists of one day

for about ten days of total life.

CONCLUSIONS.

1. Morphological variation among sibling *C. angulifera* may be detected as early as in the third instar.

2. Variations in behavior of sibling *C. angulifera* is very noticeable during the cocoon-spinning epoch.

3. The smaller size of male *C. angulifera* than that of females leads to earlier hatching of the males. This has survival value for the species.

4. Physiologic variation among sibling *C. angulifera* is demonstrated by their random times of spinning and hatching, regardless of size, in an identical environment.

5. When hatching is most rapid in both sexes of *C. angulifera*, the relative excess of males over females also reaches its maximum.

6. Chronological variation in development of sibling *C. angulifera* is augmented at the rate of one day of variation for every ten days of the colony's life.

7. Variations noted in these studies indicate that members of this colony of sibling *C. angulifera* were markedly heterozygous—so much so that the colony's activities were strongly suggestive of the species as a whole.

My thanks are due to Eleanor M. Paxson for drawing the graph accompanying this article.

The Genus Megistanis (Lepidoptera, Nymphalidae)

By WM. T. M. FORBES, Cornell University, Ithaca, New York.

This genus is one of the most striking elements of the Neotropical butterfly fauna, ranging from Central America (the single species *baeotus*) to the Upper Amazon basin, with its tributaries. We have not seen specimens from Venezuela, Guiana, or the whole eastern and soutehrn part of South America, though it seems probable that the lost *M. aeilus* came from some part of this area, (It was described from "Amboina"). The butterflies are not rare, though not too easy to catch, on the main Amazon tributaries, where I have often seen them

hawking up and down over the water, a little like a dragon-fly, and alighting on any projecting object, such as the collector's shoulder or net;- one of my specimens of *M. deucalion* was flipped into the net from a position on its edge, but others got away.

On structure it may be described as a Vanessid with the build and wing-form of a *Charaxes*. Authors who have examined it carefully, such as Reuter and Schatz, agree that it belongs to a small group of genera derived from the Vanessid stem near *Kallima*, which we may call the Gynaeciini, following Seitz. This group contains *Historis* and *Coëa*, which are very close to *Megistanis*, and also *Smyrna*, *Gynaecia* and *Callizona*, which are a little more distinct, and is most sharply defined by the palpal character given by Reuter. Superficially the species are widely divergent, but two pattern features may be noted: *Megistanis*, *Historis* and *Coëa* have a translucent spot in the fork of R_3, without any closely adjacent spot in cell R_4 or just below the R-stem, and *Megistanis* and *Coëa* have an ocellate spot on the under side of the hind wing in cell Cu_1. The first spot appears on the upper side in *Callizona* and occasional specimens of *Gynaecia*, but it is replaced by a bar below;- in all other Nymphalinae examined by me it is absent or is merely a member of a more extensive series. I know nothing of the early stages, but to judge by related forms the larva will have rows of regular branched spines, each with a strong simple apex and a whorl of spines about its middle, and most probably a weaker middorsal series (though these are vestigial in *Gynaecia*); the food is likely to belong to the Urticaceae, perhaps *Cecropia*. The pupa, to judge by *Historis* and *Coëa*, will be strongly compressed, with a pair of processes on the head and a row of middorsal spines on the abdomen.

Misidentification of the species is the rule in American collections, probably because the blue species are rather similar, and the recently described *M. amazonicus* has been generally mistaken for *bacotus* or *japetus;* and a more legitimate source of confusion is the sexual dimorphism of *amazonicus*, which is probably the reason why some earlier workers thought the en-

tire genus was a single dimorphic species, labelling all the blue forms male and all the buff ones female. We have never seen *aeilus,* but to judge by the known species, the extra buff spots probably indicate a distinct species rather than a mere aberration. The absence of the median band above may well be aberrational, and we have the corresponding aberration of *Victorina sulpitia,* as a gift from Mr. Frank Johnson, who received it from Satipo, South-Central Peru.

M. AEILUS Cramer. This species or form is the oldest in the genus and has never been recovered in modern times. I know it only from Cramer's figure. The absence of the blue or buff band is probably aberrational, but the small buff spots are likely to be a specific character. The original figure also shows seven black bars in cell Cu_1 in place of the four or five of known species, but this may be a slip of the colorist. If an aberration this can only belong to *amazonicus,* but the known range of *amazonicus* was not collected in those days and the probability is of a lost species from Surinam. The name has suffered badly. I folow Stoll's original spelling, which is repeated four times in text and index, and so is obviously not merely misprinted. It looks corrupt, but it is safer not to try to guess of what. Fabricius misspells it "*aeclus*" both in Mantissa and Ent. Syst., and Godart further corrupts this to "*oeclus*". Hűbner, in the "Verzeichniss" misspells it "*ailus*" and corrects this to "*aile*". Finally Kirby completes the confusion by accepting the "*aeclus*" misspelling, but adding the reference to *aeolus* of Fabricius' Syst. Ent. 1775,- a *Thecla,*- and giving the latter priority!

M. AMAZONICUS Riley, Ent. lii, 186, 1919. Riley did not know the dimorphic female. We have received it from Wucherpfennig, the male labelled *baeotus* and fema'e *deucalion,* from Teffé, along with true *deucalion.* This is out of the range of true *baeotus.* In our most western specimen, from the junction of the Curaray and Napo, the buff on the hind wing is extended in two narrow bands clear across cells M_3 and M_2,- a first step toward the more complete subterminal band of *Callizona.*

1. Translucent spot in fork of R_3 buff, above and below, additional small buff spots on forewing below in cells M_1 and M_3; no median band above.....*aeilus*
—Translucent spot in fork of R_3 white, and buff on under side limited to spots in and adjacent to cell Cu_1; wings above with a broad median band.....2
2. Median band on upper side buff; spotting on under side always rather heavy.....3
—Median band on upper side blue.....4
3. Median band on upper side limited by vein Cu_1, or with a small spot in cell M_3; buff spot on under side of fore wing a narrow vertical bar, followed by a large black area, often in the form of a black square with round white spot in center.....*deucalion*
—Median band on upper side of fore wing broadly extended into cell M_3; buff spot below large and squarish, followed by a pair of small black spots.....*amazonicus* ♀
4. Buff spot on under side of fore wing irregular, partly surrounding the white st. spot, which shows through from above, and followed by the two black submarginal lines only; black markings of hind wing linear; hind wing above with small, rounded, largely white st. spots in cells R and M_1.....*japetus*
—Buff spot on under side of fore wing simple, squarish and followed by a double black spot; black markings on hind wing thick; st. spots on upper side of hind wing blue when distinct 5
5. Black markings on under side very thick, the spot just beyond end of cell (e.g.) more than half as wide as high; buff patch on hind wing covering half width of cell M_3 as well as Cu_1, and half-enclosing a minute black ocellus in cell M_3. Hind wing above normally with two diagonally placed spots each in cells M_3 and Cu_1, and conspicuous blue spots in upper intersapces (Central America to Peru .....*bacotus*
—Black markings on under side lighter, the spot at end of cell a third as thick as high; yellow patch smaller, not enclosing an ocellus in cell M_3. Hind wing above normally with transverse blue bars in lower cells, and no blue in upper ones (Upper Amazon and tributaries)
amazonicus ♂

Overwintering Habits in Utah of Anopheles maculipennis freeborni Aitkens (Diptera: Culicidae).

By Don M. Rees, University of Utah, Salt Lake City.

A number of investigators have apparently had difficulty in finding overwintering Anophelines in any considerable numbers. They have, therefore, been unable to describe the type of shelters selected by these overwintering mosquitoes.

The observations recorded in the present paper of *Anopheles maculipennis freeborni* are submitted at the suggestion of Dr. Robert Matheson.

The author has been observing the overwintering habits of this species in Salt Lake City and vicinity each year since 1928. Adult females have been observed and specimens collected on numerous occasions during all of the winter months and at times when outside air temperatures were below zero degrees Fahrenheit.

The adult females pass the winter in Utah in sheltered places such as rock cellars, potato pits, granaries, garages, stables and other outbuildings. They are always more numerous in warm, dark, unoccupied or little used shelters. The females seek the protected dark corners of these structures, hiding between rafters or in cracks and crevices. Cobwebs provide a favorite resting place for these overwintering adults. They secrete themselves throughout the webbing whenever it is available and favorably situated.

During the winter months, hibernation is not complete because the females will take wing and fly short distances when disturbed. However, they have never been induced to feed in their natural shelters during the winter months.

During the latter part of April or May, the overwintering females issue from their hiding places and become active in the vicinity of their breeding water. The date of their appearance depends upon climatic conditions and is largely determined by the temperature. Overwintering Anopheline females have been induced to lay eggs under laboratory conditions but only after a blood feeding.

An Unusual Rearing of Rainieria brunneipes (Cresson) (Diptera: Micropezidae)[1]

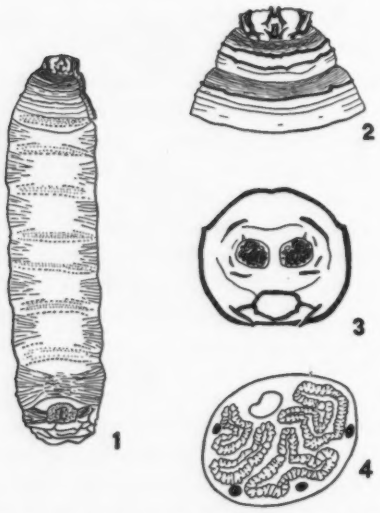
By Curtis W. Sabrosky, Michigan State College, East Lansing.

The long-legged flies, *Rainieria antennaepes* (Say) and its variety *brunneipes* (Cresson), as the latter has recently been recorded in a monograph of the family (Cresson, 1938, Trans. Amer. Ent. Soc., 64:351), are collected on the bark of trees or flying about in the woods, but they have not hitherto been reared as far as the writer can determine. Very little is known of the early stages or breeding places of most species in the family.

A severe windstorm on the evening of May 29, 1942, caused widespread damage across central Michigan, blowing down numerous trees, breaking off limbs, etc. After the storm, broken trees on the Michigan State College campus were inspected for fungus diseases by F. C. Strong, forest pathologist, and L. O. Miller, Campus Forester. Some puparia which they found were turned over to the department of entomology for rearing, and from these emerged adults of *Rainieria brunneipes*.

The puparia were found about twenty feet above the ground in the crotch of a large American elm, *Ulmus americana*. The crotch was formed by three large limbs, two of which broke away during the storm and exposed a more or less decayed area at the center, with considerable damage by fungi. On one of the broken pieces of wood left in the crotch were numerous puparia, some singly, but more commonly laid out in rows, side by side. In all, 119 puparia were counted in an area about twelve inches long and less than two inches wide, with 38 concentrated in one square inch. The wood to which the puparia adhered was still firm, though dead, but the larvae might well have been working in the softer, rotten wood nearby, some of which showed irregular granules which might have resulted from feeding by the larvae. From the general situation

[1] Journal Article No. 596 (n. s.) from the Michigan Agricultural Experiment Station.



Puparium of *Rainieria brunneipes* (Cresson). Fig. 1, Ventral aspect. Fig. 2, Dehiscent tergal plate. Fig. 3, Posterior end showing the stigmal plates. Fig. 4, Greatly enlarged view of one stigmal plate.

it seems likely that the larvae were saprophagous. Of the specimens recorded in Cresson's monograph, the type and two paratypes were collected in a bald eagle's nest, but it is not known whether they had bred there or had emerged from rotten wood or were only chance visitors.

Most of the puparia were somewhat crushed, but 22 adults (10 ♂, 12 ♀) emerged between June 3rd and June 8th, most of them on the first date. Emergence apparently occurred in the early morning, for teneral specimens were found in the rearing cage between 8:00 and 9:00 A. M., but no others throughout the day.

It is worthy of note that the entire series was of the form *brunneipes,* and not a single specimen of the so-called typical form *R. antennaepes,* which has a more extensive yellow color pattern, especially on the legs. The homogeneity of this series suggests that *R. brunneipes* may be a valid species on the basis

of its coloration, instead of a variety of *R. antennaepes.* In this same connection it may be remarked that of the many records in the family monograph by Cresson, the two forms were never collected at the same time, although they are known from the same locality in several instances.

Description of the puparia (Cf. Figs. 1-4): Shining reddish brown. Rather elongate and subcylindrical, over four times as long as broad. Anterior end depressed and truncate, posterior end blunt but slightly rounded, the stigmal plates situated on slight protuberances but not on the end of definite processes as in some families (Drosophilidae). Both tergal and sternal anterior plates are dehiscent, but the sternal plate commonly remains loosely attached to the puparium. Integument entirely without spines, tubercles or other processes, smooth with only weak striations except for the strongly striated anterior plates, and slightly stronger sculpturing at the posterior end and ventrally. Stigmal plates orange, located slightly above the longitudinal axis and separated from each other by a distance equal to little over one-third the diameter of one plate. Under low magnification they appear like brain coral, without conspicuous slits but with a distinct button and with four black spots at intervals on the periphery of each plate (Figs. 3, 4). Under high magnification, each plate appears to have four irregular to serpentine slits (Fig. 4). A small triangular sclerotized flap projects dorso-laterad from each ring. Anal opening situated far below the spiracles and not visible in direct posterior aspect.

Length, 5.75-6.5 mm.; diameter, 1.5-1.75 mm.

Specimens will be deposited in the Michigan State College Collection, the United States National Museum, and the Academy of Natural Sciences of Philadelphia

Spotted Fever in the Gulf Coast of Texas.

Four children living in a wooded area of this coast were attacked by this disease, which was fatal in two cases. The locality was found to be infested heavily with the tick *Amblyomma americanum,* two specimens of which were collected from the family of the victims. Experimental transmission tests by Parker, Philip and Jellison (1933) have proven *A. americanum* as an efficient carrier of Rocky Mountain spotted fever but no case of spontaneous infection has been definitely attributed to this tick before the observations reported here. L. Anigstein and M. N. Bader, *Science,* Oct. 16, 1942.

Annotated List of Florida Sphecinae (Hym., Sphecidae).

By H. T. FERNALD, Winter Park, Florida.

In preparing this list data have been obtained from specimens in most of the larger collections both in this country and Europe. Unfortunately, many of these specimens were collected at a time when a label "Fla." was considered sufficient with no date or place of capture given. In many cases fuller data are now available and these are included here. No attempt at a complete list of published references has been made, only synonyms for the different species being supplied in order that old name labels on specimens may be brought up to date. In a few cases brief explanations have been added to make the situation clearer. None of the specific names here given are new, all having been previously published elsewhere.

Tribe Chlorionini.

CHLORION (CHLORION) CYANEUM (Dahlb.) Dahlbom, Hym. Eur., I, 24, 1843.

This insect is generally bright blue in the more southern states as far west as Texas where a greenish shade begins to appear. West of this, it may become a bright green. I have not seen specimens of the blue from Florida, but it may occur there.

This species and variety are frequently called *caeruleum* L. in literature, but this name is preoccupied, it being not the *caerulea* of Linne's Xth edition, but first described in the XIIth edition where there are two *caeruleas,* one the same as in the other edition, the other the one now under consideration. This situation, therefore, results in the rejection of the name of the *caerulea* first described in the XIIth edition as a homonym leaving Dahlbom's *cyaneum* as the correct name for this insect.

CHLORION (CHLORION) CYANEUM AERARIUM Patt.

Chlorion aerarium Patton, Can. Ent., XI, 133, 1879.

Orlando, IX, 4, 1941. This subspecies is bronze-blue and is the most common form in the eastern states.

CHLORION (PALMODES) ABDOMINALIS (Cress.)

Sphex abdominalis Cresson, Trans. Am. Ent. Soc., IV, 211,

1874.

Florida: Tampa; Indian River City; Conway; Orlando. Between April 15 and June 15 on New Jersey Tea, and between Sept. 1 and Nov. 1 on Goldenrod. Common in central Florida at least.

CHLORION (PRIONONYX) Thomae (F.).

Sphex thomae Fabricius, Syst. Ent., 346, 1775.

Pepsis crucis Fabricius, Syst. Piez., 209, 1804.

Reported as having been taken in Florida, but all the specimens I have seen were C. *pubidorsum* Costa.

CHLORION (PRIONONYX) PUBIDORSUM (A. Costa).

Enodia pubidorsum A. Costa, Ann. Mus. Zool. Napoli, I, 69, 1862.

Prionony x bifoveolata Tasch., Zeits f. d. ges. Natur., XXXIV, 408, 1869.

Orlando; Winter Park; Winter Garden; Clarcona; Lake Harris; Indian River City; Cedar Key; Gainesville. Occurs from April 15 to June 20; first half of July and a few specimens September to November. Fairly common.

CHLORION (ISODONTIA) EXORNATUM Fern.

Isodontia exornata Fernald, Can. Ent., XXXV, 270, 1903.

Biscayne Bay; Indian River; Orlando, III, 14, 1927; IV, 25, 1942. Quite rare; apparently more common in southern Florida.

CHLORION (ISODONTIA) AZTECUM (Sauss.).

Sphex aztecus Saussure, Reise d. Novara, Hym., 38, 1867.

Sphex robusta Cameron, Biol. Centr-Am., Hym., II, 36, 1899.

Sphex macrocephalus Fox, Ent. News, I, 137, 1890.

Chokoloskee; Winter Garden, IV, 25, 1928. Rare.

CHLORION (ISODONTIA) AZTECUM CINEREUM Fern.

Sphex apicalis Smith, Cat. Hym. Brit. Mus., IV, 262, 1856. (Name preoccupied).

Isodontia macrocephala var. *cinerea* Fernald, Can. Ent., XXXIV, 271, 1903.

Enterprise; Indian River; Lake Harris, IV, 26, 1932; Winter Park, VIII, 30, 1941. Apparently rather rare.

CHLORION (ISODONTIA) AURIPES Fern.

Sphex tibialis Lepeletier, Nat, Ins. Hym., III, 339, 1845. (Name preoccupied).

Chlorion (*Isodontia*) *auripes* Fernald, Proc. U. S. Nat. Mus., XXXI, 356, 1906.

Wagner, V, 6, 1940; Orlando, IV, 21, 1928, IV, 10, 1941; Winter Park, V, 6, 1940. Not common.

CHLORION (ISODONTIA) HARRISI Fern.

Sphex philadelphica Lepeletier, Hist. Nat. Ins., Hym., III, 340, 1845.

Sphex apicalis Smith, Cat. Hym. Brit. Mus., IV, 262, 1856. (Preoccupied.)

Chlorion (*Isodontia*) *harrisi* Fernald, Proc. U. S. Nat. Mus., XXXI, 359, 1906.

Chokoloskee; Orlando, II, 11, 1932; III, 14, 1927, V, 25, 1931, XI, 8, 1935; Lake Butler, IV, 13, 1931; Winter Park, IV. 29, 1937, VI 5, 1942. Not very common. Taken on New Jersey Tea and Goldenrod.

CHLORION (AMMOBIA) HABENUM (Say).

Sphex habena Say, Ins. of Louisiana, 14, 1832.

Sphex lauta Cresson, Trans. Am. Ent. Soc., IV, 212, 1872.

Sphex lauta var. *illustris* Cress., Trans. Am. Ent. Soc., IV, 213, 1872.

Sphex princeps Kohl, Ann. natur. Hofmus. Wien, V. 398, 1889. ♀.

Sphex chrysophorus Kohl, Ann. natur. Hofmus. Wien, V, III, 399, 1890.

Sphex lanciger Kohl, Ann. natur. Hofmus. Wien, X, 55, 1895. ♂.

Chlorion habenum Fernald, Fla. Ent., XXIII, 45, 1940.

Orlando, 16 specimens (11 males, 5 females) taken between VIII, 17, and IX, 6, 1939, 1940 and 1941. The females nearly always have a black abdomen, but rarely it is brown with blackish shades. The male abdomen is brown, often with blackish shades.

CHLORION (AMMOBIA) SINGULARIS Sm.

Sphex singularis Smith, Cat. Hym. Brit. Mus., IV, 261, 1856.

Sphex chlorargyrica Costa, Ann. Mus. zool. Napoli, I, 69, 1862.

Sphex spiniger Kohl, Ann. natur. Hofmus. Wien, V, III, 428, 1890.

Chokoloskee; Orlando, IX, 2, 1939. Rare.

CHLORION (AMMOBIA) DUBITATUM (Cress.).

Sphex micans Taschenberg, Zeits. f. d. ges. Natur. XXXIV, 419, 1869. (Name preoccupied).

Sphex dubitata Cresson, Trans. Am. Ent. Soc., IV, 213, 1872.

Florida; Winter Garden, IV, 4, 1928; Gainesville, V, 11, 1928. I believe this to be the female of *C. singularis* Sm. as these two are the only species of about the same size found in Florida of which the other sex is not known. While the type of *singularis* has an entirely black abdomen, in other specimens ferruginous is mingled with the black. In quite a number of specimens from Barbadoes the males (certainly *singularis*) were accompanied by females of *dubitatum*.

Since this article was sent to the printer a male *Chlorion singularis* taken IX, 13 and three female *C. dubitatum* taken IX, 13, 16 and 19, 1942, at Daytona Beach, all at one place on the flowers of *Bidens* strengthens the belief that these are the two sexes of the same species.

CHLORION (AMMOBIA) ICHNEUMONEUM (L.).

Apis ichneumoneum Linné, Syst. Nat., Xth. ed., 578, 1758.

Florida; Orlando, and generally distributed in the State.

CHLORION (AMMOBIA) ICHNEUMONEUM AURIFLUUM (Perty).

Sphex auriflua Perty, Delect. anim., 142, 1834.

Chokoloskee; In southern Florida.

CHLORION (AMMOBIA) ICHNEUMONEUM FULVIVENTRIS (Guer.).

Sphex fulviventris Guerin, Duperry, Voy. Coquille, Zool. II, 1, 1830.

Chokoloskee; Spanish Wells. In southern Florida.

CHLORION (AMMOBIA) PENSYLVANICUM (L.).

Sphex pensylvanica Linné, Centur. Ins. rar., 30, 1763.

Winter Garden, V, 17, 1940; Winter Park, VIII, 23, 1940; Orlando, VIII, 19, 1940, IX, 6, 1940. Quite common everywhere in Florida.

Tribe Sceliphronini.

SCELIPHRON CAEMENTARIUM (Dru.).

Sphex caementaria Drury, Illustr. Nat. Hist., I, 105, 1770.

Present everywhere in Florida from about the middle of March into November. Common.

CHALYBION CYANEUM (F.).

Sphex cyanea Fabricius, Syst. Ent., 346, 1775.

Present practically everywhere in Florida from early in April to November. Common.

Tribe Podiini.

No species of this tribe have as yet been reported from Florida, but they have been taken in Illinois, North Carolina, Mississippi and Texas and may occur here. They are very rare.

Tribe Sphecini.

SPHEX AUREONOTATUS (Cam.).

Ammophila aureonotata Cameron, Biol. Centr.-Am., Hym, II, 7, 1888.

This species is not the *Pelopoeus abbreviatus* F. by which name it has often been referred to.

Orlando; Winter Park; Lake Harris; May, June, September. Not very common.

SPHEX FLORIDENSIS Fernald, N. A. Species of Sphex, 126, 1934.

Quite common at nearly all seasons of the year. Apparently, generally distributed in the State.

In the opinion of Murray (Ann. Ent. Soc. Am., XXXI, 36, 1938) this is a subspecies of *Sphex urnarius* (Dahlb.).

SPHEX PLACIDUS PLACIDUS (Sm.).

Ammophila placida Smith, Cat. Hym. Brit. Mus., Part 4, 221, 1856.

Ammophila pictipennis Walsh, Am. Ent., I, pp. 128 and 164, 1869.

Taken in March, April and May; also one specimen each in September and November. All specimens seen were from central Florida. Not very common.

So-called Papilio ajax americus Kollar in North America (Lepidoptera: Papilionidae).

By F. MARTIN BROWN, Colorado Springs, Colorado.

For many years this race has been included in the lists of North American butterflies. It does not belong there. It is the South American race and the name must be restricted to those specimens from Venezuela, Colombia, Ecuador and possibly Panama. Kollar's specimen was collected by Schomberg probably between 2000 and 1500 meters on the eastern slope of Ecuador or Colombia while enroute to the Rio Orinoco. Within that altitude range it is a very common butterfly. It is extremely variable.

All of the so-called *americus* that I have seen from the southwestern states have come from Arizona. All of them represent race *stabilis* Rothschild and Jordan. This is the typical Mexican race and its occurance on the border is to be expected. Occasionally a form occurs among typical *ajax* in the middle west states that resembles *stabilis* or *americus*. This form has been referred to *americus* Kollar.

Since this name cannot be used I propose PSEUDOAMERICUS for it. It differs from the typical form of *ajax ajax* in the breadth of the yellow bands which almost equal those of *zolicaon* Bvd. The limbal row of spots on the under side of the forewings is obscure. Otherwise, the maculation is well within the range of variation for P. *ajax ajax* L. The sides of the abdomen are yellow. This band of color is confluent with the upper row of yellow dots. Dr. Edwin P. Meiners informed me that about one per cent of the specimens from the midwest are or approach this form. I designate his specimen, taken May 9, 1910, at Troy, ILLINOIS, now in his collection at St. Louis, Missouri, the type of *pseudoamericus*.

The Nymphs of Aelia and Neottiglossa (Hemiptera: Pentatomidae)

By RICHARD C. FROESCHNER, St. Louis, Missouri.

Hart (1919)* gives a partial generic key to the nymphs of the tribe Pentatomini. In it he includes seventeen genera. However, under the name *Neottiglossa* he has apparently confused two genera: *Neottiglossa* and *Aelia*. The confusion of these two very closely allied groups is quite natural under the circumstances. According to his distributional data for *Aelia* he was not aware of its occurence eastward and so, perhaps, assumed that it was not to be considered when associating nymphs of local material with adults. He, therefore, lumped the two. This is obvious when he says, "color pale with four longitudinal black stripes or else black, with median line of notum, a very narrow lateral margin, and intermediate spots, yellowish." The first statement, that of the pale color and dark stripes, is characteristic of *Aelia* nymphs, while the remainder is true of immatures of *Neottiglossa*.

These two genera differ from *Dendrocoris* (which is in the other half of the dichotomy leading to *Neottiglossa* in Hart's key) by having the head convex dorsally with the jugae obliquely truncated anteriorly; and the lateral margin of the pronotum sparsely but distinctly punctured for its full length and without a series of short, widely-spaced spines just under the edge.

Aelia and *Neottiglossa* can be separated in the immature stages by the following couplet:

Color brownish-yellow with four black stripes: a pair running from apices of jugae posteriorly along the tylo-jugal sutures and along either side of midline as far back as the middle of the sixth tergite, and a submarginal one extending posteriorly along either side from apex of jugum to hind margin of eighth tergite; lateral and mediodorsal plates not entirely black; lateral and mediodorsal plates and tergum uniformly punctured ..... *Aelia.*

Head and notum shining bronzy black, the latter with median line, very narrow lateral margins and intermediate spots

* State of Illinois Natural History Survey, Bull. 13 (art. 7).

pale; tergum pale, lateral and mediodorsal plates entirely black; lateral and mediodorsal plates much more coarsely and densely punctured than tergum.....*Neottiglossa.*

Habitat Preferences of Polistes Wasps (Hymenoptera: Vespidae).

By PHIL RAU, Kirkwood, Missouri.

In many areas near St. Louis one may find all four species of our Missouri *Polistes* wasps nesting within easy distances of one another, but each of the four will occupy its own restricted niche, *P. annularis* in the trees, *P. pallipes* in man-made structures, *P. variatus* in or near the ground, and *P. rubiginosus* in dark, sheltered places. (Bull. Brook. Ent. Soc. 26: 111-118, 1931, and Ecology 10: 191-200, 1929). This specialization of habitat is more clear-cut when one finds only one species in a restricted area; this area, then, ceases to be the niche for the species, but assumes the status of a habitat. In the course of my studies I have come across four such habitats, i.e., the area given over to one species of *Polistes* wasps to the exclusion of all the others. The details of these habitats follow.

POLISTES RUBIGINOSUS.

Climbing Iron Mountain (one hundred miles south of St. Louis) in quest of insects on July 24, 1938, I saw many *Polistes* wasps on the wing and among the scanty vegetation of the wooded slopes. A careful examination revealed that every one was of this species. The only explanation that I could give for this is that probably the hollow trees there offered them homes. Since their nests are not exposed to the hot sun, these wasps do not require large amounts of water, as do *annularis*. The latter could not thrive on this mountain side because of the lack of water, and their absence is not surprising. *P. pallipes* were likewise lacking, as were also their favorite nesting places, sheds and other structures.

POLISTES ANNULARIS.

The next day was spent at the "shut-in" at Stout's Creek, four miles distant. The creek flows between high bluffs over a wide floor of rock which is interspersed with immense boulders (black poryphyry and red phenocysts, which give it a granite-like appearance). Struggling trees and shrubs grow sparcely among the rocks, but the steep walls of the gorge are more richly covered with vegetation. The rocks cause rapids in mid-stream, but at the edges they form many small pockets of water which are convenient and safe pools for thirsty *annularis* wasps. This valley on this July day, with no breeze reaching it and the rocks throwing back the vibrant heat, seemed the hottest place on earth. This, then, seemed to be a good habitat for *annularis*, and true to my expectations, they were there in ample numbers—they, and no others. An examination of the ravine for a third of a mile yielded twenty-two nests, from medium to very large in size, all hanging from the trees very near the stream. None were found in the thick vegetation on the slopes away from the water; neither were members of any of the other three species seen there. *Annularis* is probably the only one of the four that could survive such heat. This is not to be wondered at when we realize that *annularis* of the temperate region is an offshoot of *P. canadensis* of the tropics, and during the course of its northward migration has never lost the love for the burning sun and for the cooling water.

A similar area occupied by this species was noted along the Meramac River at Gray's Summit on the premises of the Missouri Botanical Garden. A road runs parallel with the river for a half-mile, and only about a hundred yards away from it. This road is cut through the dense growth of trees covering the river bottom. In the Spring before the trees leaf out one may easily count the last-year's nests among the branches. On April 10, 1941, I did so and counted among the trees beside or overhanging the road 36 nests, and in the bottom-land nearer the river 25 more. A total of 61 nests, medium and large, all hung diagonally on the branches and high in the trees, constituted the 1940 population of *annularis* wasps occupying less than

twenty acres of this valley. A study of the positions of these 61 nests showed that 47 of them hung from the branches in such a way as to receive the maximum amount of sunlight. The size and excellence of the nests gave testimony that this spot in the blazing sun and beside the stream fulfilled the requirements of this species.

POLISTES VARIATUS.

This species was also found occupying an exclusive habitat, and that in the heart of St. Louis. I often refer to *variatus* in my manuscript notes as the "pots-and-pans" wasps, because of its habit of nesting in old kitchen utensils and cans on dump heaps in city lots; she likes to be near to the ground, so she makes the best use of any available shelter. The nesting site observed was a sloping hill-side along the River des Peres, used for years as a dump. Many of the items of rubbish, pots, tubs and pans, which rolled to the lower levels, often were chosen by the *variatus* as nesting sites. This hill-side in summer is covered with flowering weeds, offering nectar and caterpillars, and is very attractive to many insects. A large number of *Polistes* wasps are to be found on these plants during the summer, but for the last three years (since I began to watch for them) the only species I have seen there has been *P. variatus*. Often the pans and cans are partly covered with grass and weeds, but *variatus* seeks out an opening to them somewhere to build her nest inside. I have seen dozens of nests in these situations, and I am sure I did not examine a hundredth part of the likely places among the rubbish heaps in a single season. *Variatus* wasps are ground-loving creatures, occupyng rodent burrows in the prairies of Kansas, and even though there still remain several stout, woody plants upon which they could have placed their nests, all of the queens chose to build near the ground in metal shelters. This territory harbored no other species of *Polistes* but *variatus*, but only on the opposite side of the river, in the sheds belonging to a brick-yard, were several nests of another species, *P. pallipes*, but each species kept rigidly to its own territory, although it seemed easy, since the river was very narrow, for the two to intrude into each other's domain.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (•); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( ) follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Beall, G.—Mass movement of the wasp, Polistes fuscatus var. pallipes Le P [Canad. Field Nat.] 56:64-66. **Bequaert, J.**—William T. Davis, the naturalist. [19] 37 (4): 139-140. **Calvert, P. P.**—The early history of science and learning in America. Entomology, scientific and human aspects. [Proc. Amer. Phil. Soc.] 86 (1): 123 129. **Cleaves, H.**—W. T. D[avis] [19] 37 (4): 132-138, portraits. **Cockerell, T. D. A.**—The duty of the entomologist [68] 96 (2493): 338. **Dobzhansky, T.**—Species as they appear to a geneticist. [6] 50 (3): 291 (abstract). **Fletcher, F. C.**—The arrangement of insect specimens in boxes and drawers. [118] 16 (1): 5-6, ill. **Gaines, J. C.**—Several important insect pests of cotton. I. Relation of population to migration. [Iowa State Coll. Jour. Sci.] 17 (1): 63-65. **Guyton, F. E.**—The block method of mounting insects. [12] 35 (3): 461-462, ill. **Harvey, Wm. Clunie and Hill, Harry.**—Insects Pests. Chemical Publishing Co., Inc., Brooklyn, New York. 1941. Pp. ix, 292, 23 figs. **Hull, L. G.**—Entomological gems. [107] A 17 (7-9): 77-80. **Knowlton, G. F.**—Range lizards as insect predators. [12] 35 (4): 602. **Lambert, R.**—Les insects forestiers du Québec en 1941. [98] 69 (8-9): 173-205. **Martin, W. E.**—Hormones in Arthropods. [Proc. Indiana Acad. Sci.] 51:267-272. **Shelford, V. E. & Boesel, M. W.**—Bottom animal communities of the island area of western Lake Erie in the

summer of 1937. [43] 42 (5): 179-190. **Swingle, M. C. & Phillips, A. M.**—An insect rearing box with electric barriers.1 [12] 35 (4): 603-604, ill. **Teale, Edwin Way.**—Near Horizons. The story of an Insect Garden. Dodd, Mead & Co., New York. 1942. Pp. xiv, 319, ill. William T. Davis. An appreciation [19] 37 (4): 118-126, portraits. **Torre-Bueno, J. R.**—To William T. Davis, eighty years young. [19] 37 (4): 117. **W[eiss], H. B.**—Entomologists and the war. [12] 35 (4): 609-610.

ANATOMY, PHYSIOLOGY, ETC.—Bickley, W. E.—On the stomodaeal nervous system of insects. [7] 35 (3): 343-354, ill. **Gregg, R. E.**—The origin of castes in ants, with special reference to Pheidole morrisi Forel. [84] 23: 295-308. **Hartzell, A. & Scudder, H. L.**—Histological effects of pyrethrum and an activator on the central nervous system of the housefly. [12] 35 (3): 428-433, ill. **Haseman, L.**—Killing codling moth larvae with low temperatures. [12] 35 (3): 449-450. **Prosser, C. L.**—An analysis of the action of acetylcholine on hearts, particularly in arthropods. [92] 83 (2): 145-164. **Richards, A. G., Jr.**—The interfibrillar material in the central nervous system of mosquito larvae (Culex pipiens) [92] 83 (2): 300. **Richards, A. G., Jr., & Anderson, T. F.**—Further electron microscope studies on arthropod tracheae. [6] 50 (3): 245-247. **Villee, C. A.**—The phenomenon of homoeosis. [90] 76: 494-506. **William, C. M.**—The effects of temperature gradients on the pupal-adult transformation of silkworms. [92] 82: 347-355.

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NOTICE

With the increasing demands of the present war times upon the volunteer services of all concerned with the work of the NEWS, and the limitations imposed upon business, it is impossible to foresee what the coming months may bring forth, but it is our earnest hope that a change of printers will be the least of our problems, and that our journal may continue to fill the place it has so long occupied in American Entomology.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—Living specimens of the luminous beetle **Phengodes** this summer. E. Newton Harvey, The Biology Dept., Princeton University, Princeton, New Jersey.

I want to collect Rothschildia, agapema, gulfina and io moths and Texas butterflies for interested persons. Eula Frizzell, R 4 San Benito, Texas.

Wanted—Specimens of the genus Trox from North America. Will exchange or determine for duplicate material. Mark Robinson, 231 Cherry St., Sharon Hill, Pennsylvania.

Lepidoptera—From the South, including P. palamedes, T. halesus and E. jucunda to exchange for fauna from other localities. H. W. Eustis, Woodbine Rd., Lakemont, Augusta, Georgia.

Wanted—Egg cases of preying mantids. Correspondence desired with those who will collect. Osmond P. Breland, Department of Zoology, The University of Texas, Austin, Texas.

Wanted—To buy, specimens of bees of the genus **Nomada**, any quantity, especially North American. Quote price, locality. Hugo G. Rodeck, University of Colorado Museum, Boulder Colorado.

Arctic Lepidoptera especially **Noctuidae**—Wanted to hear from collectors who desire the Arctic Species. Have large collection. R. J. Fitch. Lloydminster, Saskatchewan, Canada.

Wanted—Tropical Lepidoptera and Insects. Also domestic species. Will exchange or buy specimens. M. A. Zappalorti, 253 Senator Street, Brooklyn, N. Y.

Wanted—Specimens of the genus Calendra (Sphenophorus) from North America. Will exchange Eastern U. S. Calendra or other Coleoptera for desired species. R. C. Casselberry, 302 Lincoln Avenue, Lansdowne, Penna.

Coccinellidae wanted from all parts of the world, especially South and Central America. Buy or exchange. G. H. Dicke, 1101 Argonne Drive, Baltimore, Md.

WANTED

Good Entomological Libraries

("And They Must Be GOOD")

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Up to date, specialized libraries preferred, also carefully assembled libraries on the general subject.

I am not at all interested in miscellaneous lots of material which have been discarded as of no use by their owners: e. g. Reports of State Entomologists, non-technical bulletins, common Government publications, purely popular works, etc.

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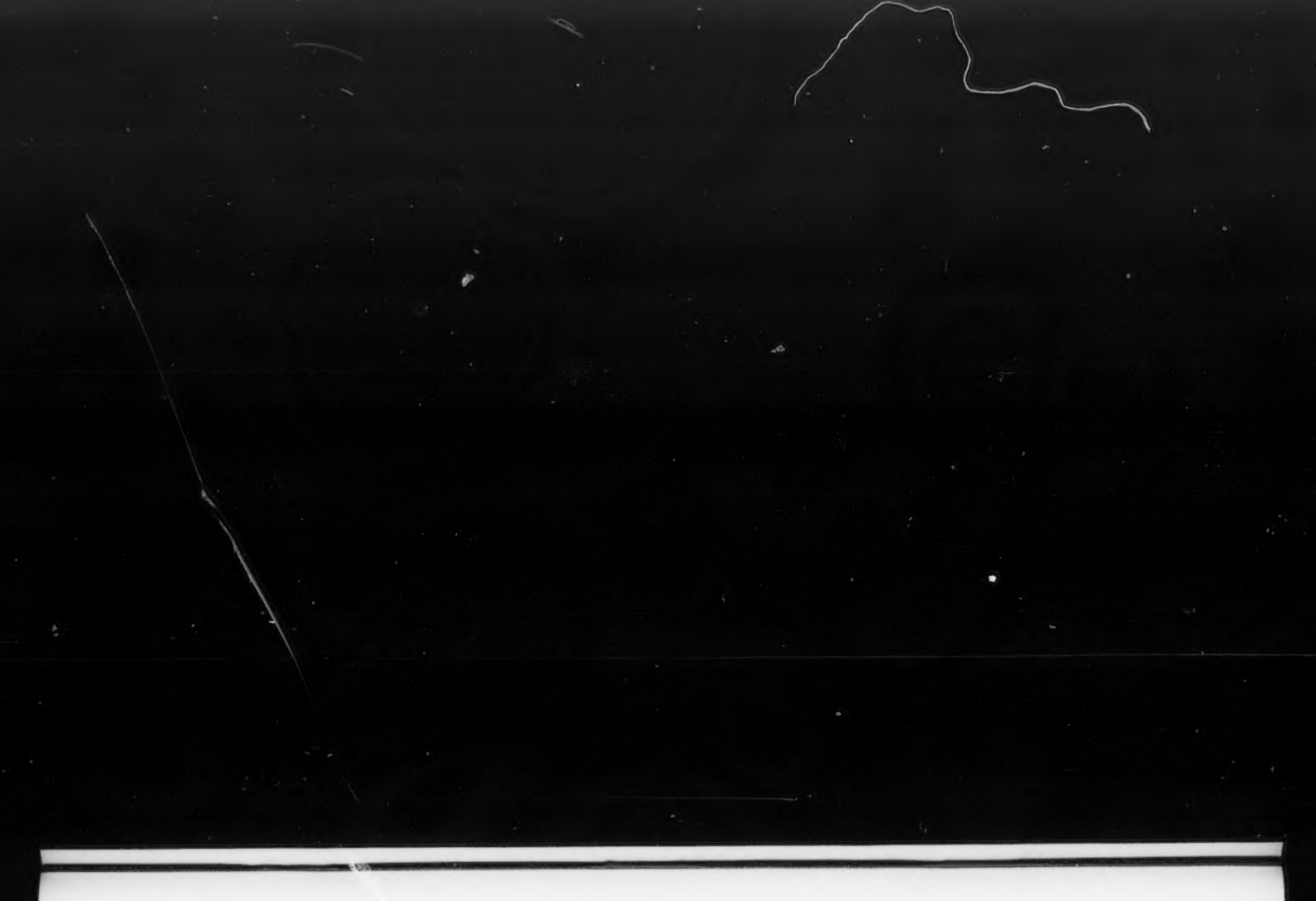

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